**MONTANA DEPARTMENT OF ENVIROMENTAL QUALITY**
Permitting and Compliance Division
Water Protection Bureau
P.O. Box 200901
Helena, Montana 59620-0901

**Permit Fact Sheet**
**Montana Ground Water Pollution Control System (MGWPCS)**

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|---|---|
| Permittee: | Estates at Wilderness County Water and Sewer District |
| Permit No.: | MTX000194 |
| Facility Name: | The Wilderness Club |
| Facility Location: | SE, NW Section 32, Township 37 North, Range 27 West, Lincoln County |
| Facility Contact: | James B. Cole, Managing Member<br>Norcal Group<br>3015 12th Street NE, Suite 260<br>Calgary, Alberta Canada T2E 7J2<br>Phone (403)735-1887 |
| Receiving Water: | Class I ground water |
| Number of Outfalls: | one (1) For the purpose of fee determination. |
| Outfall(s)/Type: | 001 - Subsurface Drainfield |

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## I. PERMIT STATUS

This statement of basis is for the issuance of a new wastewater discharge permit for The Wilderness Club (TWC) development pursuant to the Montana Ground Water Pollution Control System (MGWPGC). The permittee, which is the Estates at Wilderness County Water and Sewer District submitted a permit application that was received on January 16, 2007, without fees. On February 2, 2007, the Department received the required fees. The permittee has not requested a ground water mixing zone based on the absence of shallow ground water at the proposed wastewater treatment site. The application was determined to be deficient on March 1, 2007. The application was determined to be complete on July 11, 2007. This is a new source and is therefore subject to the Montana Nondegradation Policy (75-5-303, MCA) and the administrative rules (ARM 17.30.701, et seq.).

This proposed subdivision is also subject to review and approval under the Montana Sanitation in Subdivision Act. The applicant submitted plans and specifications for review and received a Certificate of Subdivision Plat Approval from the Department on December 12, 2006 (EQ#06-3006).

## II. FACILITY INFORMATION

### A. General Description

TWC is located approximately three (3) miles northwest of Eureka, on the west side of Highway 93 North. The west side of the development borders the east bank of Lake Koocanusa (Kootenai River). TWC will consist of 271 single-family residential lots, one commercial lot located at the current lodge location, three "cabin pod" areas to be used for 47 condominiums and a clubhouse with a pro shop, a restaurant, and a bar for a total of 319 units.

### B. Wastewater Collection, Treatment and Disposal

Each single-family lot, each condominium, and the clubhouse will have an individual E/one GP 2010 grinder pump station, which will pump raw sewage to a pressure sewer (force main) collection system. Kitchen and associated wastewater from the clubhouse, restaurant, and bar will pass through a grease trap prior to the grinder pump station and prior to entering the collection system.

Wastewater from the collection system will be routed to one 215,000-gallon (cast-in-place) concrete community septic tank with four outlets. The septic tank will provide primary anaerobic treatment as well as removing floatable and settleable solids. Wastewater will gravity flow from the community septic tank to a 145,000-gallon, 4-compartment cast-in-place concrete recirculation tank. Each chamber of the recirculation tank will dose separate recirculating sand filters (RSFs). There will be four (4) RSFs. Each RSF will be 68 feet x 72 feet (see Attachment 1).

Level II wastewater treatment will occur in the RSFs. Each RSF will have 6 zones, with each zone having an area of 12 feet x 68 feet. Two zones share a collection pipe that collects the effluent at the base of the RSFs and recirculates it back to the recirculation tank. A splitter valve in the recirculation tank sends $3/4^{th}$ of the effluent back to the recirculation tank and $1/4^{th}$ to a 5,000-gallon dose tank. A Sparling Instruments Co. Inc. Tigermag Model 626 EP flangeless electromagnetic flow meter will measure flow from the 5,000-gallon dose tank prior to discharge to the drainfield distribution box. From this distribution box, effluent is routed to one of five dose tanks, which pressure-doses each of the 5 groups of 10 total subsurface drainfields. Each of the 10 subsurface drainfields has six zones. Each zone has an area of 52 feet x 67 feet with eight (8) 67-foot long laterals in 3-foot standard trenches.

The applicant has requested to discharge a maximum of 96,650 gallons per day (gpd).

## III. DESCRIPTION OF THE DISCHARGE

### A. Outfall Location

The proposed permit authorizes the permittee to discharge residential strength wastewater from a RSF treatment system to a subsurface drainfield (Outfall 001).

- Outfall 001 is located in the west-southwest portion of the proposed development.

B. Past Monitoring Data/Effluent Characteristics

1. Past Monitoring Data

This is a proposed site and the permittee has not collected wastewater samples.

2. Effluent Characteristics

The effluent that is discharged from a typical RSF system to a subsurface drainfield is expected to have the following average chemical characteristics:

- Total Nitrogen (sum of nitrate, nitrite and ammonia and organic nitrogen as N) 10-50 mg/L [EPA, 2002 p. 3-29 (Table 3-19)]
- Total Nitrogen: 26 mg/L (DEQ, Nitrate Sensitivity Analysis, 1994)
- Total Phosphorus: 10.6 mg/L (DEQ Memo-Regensberger, 1998)
- Biological Oxygen Demand (BOD): 2-15 mg/L (EPA, 2002, as above)
- Total Suspended Solids (TSS): 5-20 mg/L (EPA, 2002, as above)
- Fecal Coliform Bacteria: $10^1 – 10^3$ organisms (EPA, 2002, as above)

According to ARM 17.30.702(11), Level II treatment means, the wastewater treatment system removes at least 60% of the total nitrogen (TN) as measured from the raw sewage load to the system, or the system discharges a TN effluent concentration of 24 mg/L or less.

IV. SITE CHARACTERISTICS

A. Soils

Soil Survey information describes the soils in this area as glacial outwash terraces, known as Calcixerollic Xerochrepts. This soil unit is associated with terraces that range in elevation from 2,500 to 2,700 feet above mean sea level. Terrace surfaces have been reworked by wind and are characterized by dunes that have low relief and by depressions. Dominant slopes have gradients of 0 to 15 percent, but are as much as 40 percent on the sides of dunes. The terraces are adjacent to major rivers (i.e., Kootenai River).

Based on the data collected from eight test pits and one boring in the area of the proposed drainfield, topsoil at the site consists of brown sandy loam from six to nine inches below ground surface (bgs). Beneath the topsoil is a layer of loamy silty sand, generally tan in color. The thickness of this layer is extremely variable ranging from 1.25 feet to 6 feet thick. When mapped, the data show the thickness of the loamy silty sand layer thinning over the northeast portion of the proposed drainfield area. A gray, medium sand with no cobbles is consistent below the loamy silty sand. This gray sand was logged as deep as 20.5 feet, which was the total depth of Test Boring G.

Percolation tests conducted in seven of the test pits demonstrate that percolation rates are nearly a magnitude higher in the south half of the proposed drainfield area. This roughly coincides with the area associated with the thinner loamy silty sand deposition, providing evidence that some of these percolation tests were actually conducted in the gray medium sand.

B. Geology

This project is located in the Rocky Mountain Trench, which is a narrow northwest trending topographic depression that formed during the Laramide Orogeny as part of the Paleocene or Eocene Epoch. The trench is associated with down-faulting between major longitudinal faults. TWC is located on the Tobacco Plains, a relatively flat present-day surface on the floor of the Rocky Mountain Trench that extends from the International Boundary to Eureka. Isolated drumlin-like hills and kettle lakes are scattered across the flat plains. Vegetation is grassy and not consistent with the surrounding forested mountainous areas. The Kootenai River bounds the plains on the west. The Whitefish Mountain Range is to the east.

Precambrian bedrock of the Belt Supergroup form the walls along the Rocky Mountain Trench and are exposed at, or near the surface between depositional basins within the trench area. The Belt Supergroup is composed of metasedimentary rocks are mostly composed of fine-grained argillite, impure limestone, and quartzite in this area.

Separate depositional basins within the trench area have been filled with nearly 3,000 feet of sediments. These deposits are primarily glacial and fluvial-glacial in nature and include dune sands, lake-bottom or deltaic deposits, outwash deposits, and till associated with the advance and retreat of the Cordilleran (Pleistocene) ice sheet.

C. Hydrogeology

Most of the supply wells (2 wells) in this area are completed in the semi-confined/confined aquifer(s). The confining layer consists of gravelly clay and is generally encountered at or below 100 feet deep in this area (e.g., Town of Rexford Well, Chapman Well, see discussion below).

The two water supply wells that are located closest to the site are to the south. These wells are completed in deeper aquifer(s) beneath layers containing clay. These aquifers are semi-confined to confined. The Town of Rexford Well is approximately 1,000 feet south-southwest (downgradient) of the proposed drainfield. First water was encounter in this well at 145 feet (-2439.5 feet) beneath a 69-foot thick confining clayey sand with gravel and gravelly clay. However, the well is screened and produces from a much deeper sand and gravel aquifer from 285 to 294 feet and from 304 to 311 feet. The Chapman Well is a private supply well located approximately 1,500 feet south-southeast of the proposed drainfield. This well is an open-bottom completion at 175 feet deep (5 feet into the gravels at -2427.5 feet), which are beneath a 50-foot thick confining clay-gravel layer. This data correlated northward to the site indicates the shallow ground water beneath the site exists under confined conditions and should not be affected by the effluent discharge.

There are spotty, limited yield, shallow, unconfined aquifer(s) that have been identified in the deltaic deposits and low permeability glacial lake-bottom sediments in Tobacco Plains. There are some shallow wells completed in the outwash deposits. In general, the occurrence of the shallow, unconfined ground water is unpredictable in this region. Most supply wells completed in the unconfined aquifer(s) that offer a substantial enough yield for usage are completed in the alluvium deposited along rivers and streams.

Efforts to find shallow ground water in the area of the proposed subsurface drainfield were accomplished by drilling the following three holes and observing the soils and subsoils for moisture content and potentially saturated sediments.

1. Boring 1 was drilled on July 26, 2006, to a total depth of 55 feet. This boring encountered mostly silty clay, changing to clayey sand with depth. Boring 1 is located approximately 500 feet northeast of the proposed drainfield and hydrogeologically upgradient. No shallow ground water was encountered in Boring 1.

2. Boring 2 was drilled to a total depth of 48 feet in February 2006. This boring is located approximately 750 feet east of the proposed drainfield. Boring 2 was completed as a well (GWIC 228251) in sand that grades from fine to coarse-grained with depth. The screened interval is from 27 (-2512 feet) to 37 feet. No shallow ground water was reported on the driller's log and there was no SWL was provided.

3. A "Drainfield Test Well" GWIC # 236193 was drilled to a total depth of 80 feet deep (-2456.4) on April 24, 2007. This well was was drilled approximately 500 feet southwest (towards Lake Koocanusa) from the proposed drainfield area. Subsoils consist of silt and fine sand to 25 feet deep, becoming medium to coarse-grained from 40 feet to 80 feet. No moisture or saturated soils were encountered during drilling. The boring remained open at the bottom with the drill pipe in the hole for 24 hours. No shallow ground water was observed in the open-hole during this period of time. This boring was completed as a steel-cased, open-bottom well completion. As of September 9, 2007, this well remains dry. The data indicate shallow sediments in the vicinity of the proposed drainfield do not contain sufficient moisture to promote shallow ground water flow. In addition, the heterogeneous nature of the sediments, glacial lake and outwash deposits provides an anisotropic media, at best, which does not promote hydraulic characteristics for extensive interconnected flow hydraulically or vertically.

D. Hydrology

Since there has been no evidence of unconfined shallow ground water beneath the proposed location of the drainfield and the immediately surrounding area, there is no applicable ground water gradient, hydraulic conductivity, or nitrate (as N) ground water quality data available at this site.

The nearest surface water topographically downgradient from the proposed drainfield area is Lake Koocanusa (Kootenai River), which is approximately 2,300 feet west of the proposed drainfield area.

On the Tobacco Plains, there is little or no surface drainage. From May through June, rivers and streams in this area are at high stage due to snow-melt, so they are losing out into the shallow alluvial aquifer reservoirs deposited along the surface water bodies. At the end of June, the river stage decreases and ground water is retained in bank-storage, which eventually discharges to surface water (rivers, streams,etc.).

Sophie Lake is approximately 3,750 feet to the north-northeast of this wastewater treatment site. This is the only stream-fed lake in the area. All of the other lakes are sourced from snow-melt and fed by ground water held in storage in deposits adjacent to the lakes. Grob Lake, located approximately 1,100 feet northeast of the proposed drainfield area has been observed to recharge the shallow sediments

within a distance of approximately 500 feet from the downgradient shoreline of that lake. The majority of these are lakes are pothole-type lakes that are not hydraulically connected.

## V. RECEIVING WATER

### A. Water-Use Classification and Applicable Water Quality Standards

In the absence of shallow ground water at this site, ground water samples have not been collected from beneath the proposed wastewater treatment site.

Local water quality from selected wells, springs, lakes, and streams in the Tobacco and Stillwater River Valleys is good. The average total dissolved solids (TDS) concentration from 44 samples collected and analyzed in this study area (Coffin, Table 9, 1971) is 327 mg/L. The formula for calculating specific conductivity from TDS (Anderson, 1993) is,

TDS (mg/L) divided by K = specific conductivity (μmhos/cm)

Where "K" is 0.65 (may range from 0.55 to 0.75)

327 divided by 0.65 = 503 μmhos/cm

According to the above calculation, the average specific conductivity is 503 μmhos/cm based on the TDS data. The calculated average specific conductivity value was used to determine the classification of the ground water at the site. Therefore, the classification of the receiving ground water is Class I ground water has a specific conductivity of less than or equal to 1,000 μmhos/cm at 25 degrees Centigrade, as defined by ARM 17.30.1006(1). According to ARM 17.30.1006(1)(a), the quality of Class I ground water must be maintained so that these waters are suitable for public and private water supplies, culinary and food processing, irrigation, commercial and industrial purposes, drinking water for livestock and wildlife, with little or no treatment. Human health standards listed in DEQ Circular 7 (February 2006) apply to concentrations of dissolved substances in Class I ground water.

The applicable ground water quality standards and nondegradation significance criteria are included in Table 1.

**Table 1. Applicable Water Quality Standards and Nondegradation Significance Criteria**

| Parameter | DEQ Circular 7 Human Health Ground Water Standards | Nondegradation Significance Criteria in Ground Water for Level II Treatment |
|---|---|---|
| Nitrate (as N) | 10 mg/L | 7.5 mg/L |
| Total Phosphorus | no standard | 50 year breakthrough [(1)], mg/L |
| E-Coli Bacteria | <1 organism per 100 ml | <1 organism per 100 ml |

[1] The phosphorus significance criteria is listed in ARM 17.30.715(1)(e): "changes in concentration of total inorganic phosphorus in ground water if water quality protection practices approved by the department have been fully implemented and if an evaluation of the phosphorus adsorptive capacity of the soils in the area of the activity indicates that phosphorus will be removed for a period of 50 years prior to a discharge to any surface waters."

## VI. MIXING ZONE

The permittee has proposed to discharge all treated wastewater from a single outfall (Outfall 001) and has not requested a ground water mixing zone. In the absence of a mixing zone, Class I water quality standards apply at the end of the pipe. There are no drinking water wells within 100 feet of the proposed drainfield.

## VII. PROPOSED EFFLUENT LIMITS

Data show recirculating sand filter (RSF) wastewater treatment systems produce a high quality effluent, and are considered to be a Level II treatment according to ARM 17.30.702(11). A Level II system must provide at least a 60 percent removal of total nitrogen (TN) in the raw wastewater or an effluent TN concentration of 24 mg/L or less beneath the drainfield [ARM 17.30.702(11)]. The Department has established that a properly installed, operated and maintained RSF wastewater treatment system meets the definition of a Level II system.

The permit limit for TN will be set at 26 mg/L in the effluent, prior to discharge to the drainfield because an additional 7% of nitrogen removal (through treatment) is assumed to occur within the drainfield providing a final TN concentration discharged to ground water of 24 mg/L.

The TBEL will also be expressed as a load (lb/day) based on the average daily design flow of the system (96,650 gpd) and the daily maximum concentration as follows:

*Load limit (lbs/day) per outfall = effluent flow rate (gpd) x daily maximum concentration (mg/L)* **x** *(8.34 x $10^{-6}$)*

Load limit (lbs/day) per outfall= (96,650 gpd) **x** (26 mg/L) **x** (8.34 x $10^{-6}$)

Load limit (lbs/day) per outfall= 20.96 lbs/day

Based on the performance of the system, the technology-based effluent limits (TBELs) for TN are set forth in Table 2.

**Table 2. Technology-Based Effluent Limits for Outfall 001**
**(at the dose tank prior to discharge to the subsurface drainfield)**

| Parameter | Daily Maximum[(1)] Concentration (mg/L) | 90-Day Average Load[(1)] (pounds per day) |
|---|---|---|
| Total Nitrogen, as N (TN) | 26 | 21 |

(1) See definitions, Part V. of the permit.
NA = Not Applicable

## VIII. PROPOSED WATER QUALITY-BASED EFFLUENT LIMITS

The Montana Water Quality Act requires that a discharge to state water shall not cause a violation of a water quality standard outside of a Department authorized mixing zone. Water quality limitations must be established in permits to control all pollutants or pollutant parameters that are or may be discharged at a level which will cause, have reasonable potential to cause or contribute to an excursion above any state water quality standard. The permittee must comply with Montana Numeric Water Quality

Standards included in DEQ Circular 7 (February 2006) and the protection of beneficial uses (ARM 17.30.1006).

A. Nitrate

The proposed wastewater system constitutes a new source [ARM 17.30.702 (18)(a)]. Class I ground water is considered high quality water and is subject to Montana's Nondegradation Policy (75-5-303, MCA).

Subsurface elevations were calculated based on first moisture/ground water-bearing zone or ground water (as available) and show the "Drainfield Test Well" GWIC # 236193 was drilled 56.4 feet deeper than Boring 2, in which there has been no free water observed in the well and 50.7 feet below low stage in Grob Lake to the north. This test well was drilled within 73 feet (subsurface elevation) of the first confined ground water identified on the log for the Town of Rexford Well located approximately 1,000 feet to the south.

In the absence of shallow unconfined ground water at this site, no ground water quality samples could be collected for analysis, no aquifer pump test(s) could be conducted to determine a hydraulic conductivity, and no hydraulic gradient could be calculated based on shallow ground water elevations. Therefore, a nondegradation analysis could not be done and water quality-based effluent limits (WQBELs) for nitrate (as N) will not be applied to this discharge. The confining nature of the deep aquifer(s) in this area, support the fact that the drainfield discharge should not affect the quality of the aquifer beneath the site.

B. Phosphorus

A concentration of 10.6 mg/L of total phosphorous is consistent with the concentration found in residential wastewater. The estimated load from this facility is 8.54 pounds per day (lbs/day) based on the average daily design flow for Outfall 001 (96,650 gpd) and the average phosphorous concentration for domestic sewage, which is 10.6 mg/L.

More precisely, phosphorus is removed mainly through soil sorption processes, which are slow and vary based on soil composition. The total phosphorus (TP) limitations are imposed to ensure that the quality of the effluent meets the nondegradation significance criteria prior to discharge into any surface water [ARM 17.30.715(1)(e)]. The effluent limits do not include a concentration limit for phosphorus because the method used to determine compliance is the 50-year breakthrough analysis. The 50-year breakthrough nondegradation criterion is based on the amount of soil available to adsorb the phosphorus between the discharge point and the surface water using the average load of phosphorus from the wastewater source.

At this facility, topographic gradient suggests a general ground water flow direction of west-southwest toward Lake Koocanusa. The lake is approximately 2,300 feet downgradient from the outfall. A phosphorous breakthrough analysis shows the breakthrough time to the surface water is 171 years. Therefore,the discharge from this outfall is considered nonsignificant degradation pursuant to ARM 17.30.715(1)(e). The effluent limit for the TP load discharged to the drainfields shall not exceed 3,117 lb/year, which is 8.54 lb/day due to the potentially variability in the users and their associated discharge rates.

The WQBELs are summarized in Table 3.

**Table 3. Water Quality-Based Effluent Limit for Outfall 001**

| Parameter | 90-Day Average Load[(1)] (pounds per day) |
|---|---|
| Total Phosphorus, as P (TP) | 8.54 |

(1) See definitions, Part V. of the permit.

C. E-Coli Bacteria

The Department is not granting a mixing zone for E-coli bacteria because a properly sited and operated drainfield should remove most, if not all, of the pathogenic bacterial indicators within 2 to 3 feet of the drainfield's infiltrative surface (USEPA, 2002). The E-coli water quality standard is <1 organism per 100 ml in the ground water (DEQ Circular 7, 2/2006). Based on the following site-specific criteria, ground water monitoring for E-coli bacteria at the hydraulically downgradient edge of the subsurface drainfields will not be required at this time.

- No shallow ground water was encountered beneath the area of the proposed drainfield (see GWIC#236193).
- Based on the lithology and the confining nature of the aquifer(s) in this area, it is unlikely for E-coli bacteria to impact the potentially deeper ground water beneath the site.

The systematic pressure-dosing of the drainfields will minimize saturated conditions and maximize the die-off rate in the natural sediments. The proposed subsurface drainfields will discharge effluent approximately 1 to 3 feet below the ground surface. Natural treatment shall occur in the unsaturated soil-subsoil materials above the confining layer.

D. $BOD_5$ and TSS

5-day biological oxygen demand ($BOD_5$) and total suspended solids (TSS) are monitored for wastewater treatment system efficiency to ensure the effective removal of biological material and that the proper aerobic biological processes are being maintained. There are no numeric ground water quality standards for BOD and TSS, however according to ARM 17.30.1006(1)(b)(ii) the beneficial uses for a Class I ground water must be maintained. BOD and TSS are not subject to nondegradation unless they have a reasonable potential to affect a beneficial use based on the significance criteria for BOD and TSS, which are narrative [ARM 17.30.715 (1)(g) and DEQ Circular 7].

## IX. PROPOSED FINAL EFFLUENT LIMITS

The proposed effluent limitations for Outfall 001 are summarized in Table 4 and are based on the more restrictive of the technology and water quality criteria discussed in previous sections. The final proposed effluent concentration limit for nitrate + nitrite, (as N) is based on water quality standards and nondegradation criteria. The concentration limit is proposed to ensure the system operates within water quality standards with an effluent concentration of nitrate + nitrite, (as N) at Outfall 001, not to exceed 7.5 mg/L.

The effluent limit for TP is water quality-based as determined according to nondegradation significance criteria. The water quality-based effluent load limit considers the assimilative capacity of the soil system to estimate the maximum load of phosphorus discharged to the ground water without exceeding

the 50-year breakthrough. The 90-day average load limit will provide protection for the surface and ground water.

The effluent limits apply to the treated effluent at the dose tank prior to discharge to the drainfields as shown in Attachment 1.

**Table 4. Numeric Effluent Limits for Outfall 001**

| Parameter | Daily Maximum Concentration (1) (mg/L) per Outfall | 90-Day Average Load(1) (pounds per day) per Outfall |
|---|---|---|
| Nitrate + Nitrite, as N | 7.5 | NA |
| Total Phosphorus, as P (TP) | NA | 8.54 |

(1) See definitions, Part V of the permit.
NA Not Applicable

Other Discharge Limitations:

The maximum daily flow of effluent discharged to Outfall 001 shall not exceed 96,650 gpd (see GW-1 application, received 1/16/07).

X. MONITORING REQUIREMENTS

A. Influent Monitoring

The permittee will be required to monitor the influent for the constituents in Table 5, at the frequency and with the type of measurement indicated. Samples or measurements shall be representative of the volume and nature of the monitored waste stream. Influent sampling/monitoring shall be conducted of the raw influent collected from the 215,000-gallon central septic tank prior to entering the recirculation tank and the RSF (see Attachment 1).

**Table 5. Influent Monitoring Parameters**

| Parameter, units | Frequency | Sample Type(1) |
|---|---|---|
| Nitrate + Nitrite (as N), mg/L | Quarterly | Composite |
| Total Kjeldahl Nitrogen (as N), mg/L | Quarterly | Composite |
| Total Nitrogen, as N (TN), mg/L | Quarterly | Calculated(2) |

(1) See definitions, Part V of the permit.
(2) Total Nitrogen (as N) TN = (nitrate + nitrite, as N) + total Kjeldahl Nitrogen (TKN)

B. Effluent Monitoring

Effluent monitoring is essential to ensure the effective treatment and consistency of the wastewater discharged from the facility. The effluent limits are established to protect the ground water from a change in water quality that would cause degradation [ARM 17.30.715] or cause a change in beneficial use [ARM 17.30.1006(1)(a)]. Samples or measurements shall be representative of the volume and nature of the monitored discharge at the outfall.

Effluent monitoring/sampling shall be conducted by collecting a composite sample from the wastewater treatment system dose tank that is representative of the discharge prior to discharging to the subsurface

drainfields (Outfall 001). Dose tank samples shall be submitted to the laboratory for analysis of all of the parameters in Table 6.

The permittee shall monitor the effluent at Outfall 001 for the parameters in Table 6 and at the frequency and with the type of measurement and sampling as indicated. If no discharge occurs during the entire monitoring period, it shall be stated in a Discharge Monitoring Report (DMR) that "no discharge" occurred.

**TABLE 6. Parameters To Be Monitored in the Effluent for Outfall 001 (At the Dose Tank)**

| Parameter, units | Frequency | Sample Type[1] |
|---|---|---|
| Effluent Flow Rate, gpd[2] | Continuous | Continuous[1] |
| Total Suspended Solids,(TSS), mg/L | Quarterly | Composite |
| Biological Oxygen Demand ($BOD_5$), mg/L | Quarterly | Composite |
| Total Kjeldahl Nitrogen, as N (TKN), mg/L | Quarterly | Composite |
| $NO_3$+$NO_2$ (as N), mg/L | Quarterly | Composite |
| Oil and Grease, mg/L | Quarterly | Grab |
| Total Phosphorus, as P(TP), mg/L | Quarterly | Composite |
| Total Nitrogen, as N (TN), mg/L | Quarterly | Calculated[3] |
| Total Nitrogen, as N (TN), lb/d | Quarterly | Calculated[4] |
| Total Phosphorus, as P (TP), lb/d | Quarterly | Calculated[4] |

(1) See definitions, Part V of the permit
(2) To be measured by a totalizing flow meter at the dose vault
(3) Total Nitrogen, as N = nitrate + nitrite, (as N) + total Kjeldahl nitrogen, (as N)
(4) See definition of "quarterly average" in Part V of the permit.

The 90-day average load for TN and TP are the sum of the calculated loads for each TN and TP sample collected within the 90-day period, divided by the number of samples collected and analyzed for TN and TP.

The effluent measurement method shall be either by recorder or totalizing flow meter; dose counts or pump run-times will not be accepted for new wastewater systems. The permittee shall monitor the flow of the effluent for Outfall 001 at the meter to be located following the dose tank prior to entering the subsurface drainfields (see Attachment 1). The permittee shall report the flows for Outfall 001 based on the average (gpd) for each quarter. The permittee has stated in the permit application that the method of flow monitoring will be a Sparling Instruments Co. Inc. Tigermag Model 626 EP flangeless electromagnetic flow meter.

C. Ground Water Monitoring

Due to the confining nature of the lithology in the area, the effluent is not predicted to impact the confined aquifer beneath the site. Therefore, ground water monitoring will not be required at this time.

D. Corrective Action – Effluent Permit Limits

The effluent permit limits are listed in Table 4. An exceedance of an effluent limit will require a resample be collected from the dose tank (prior to discharge to the drainfields) within 72 hours of the

laboratory notification of the analytical results from the scheduled sampling event. Corrective action will need to be implemented should the analytical results from the re-sample verify the exceedance(s).

Corrective action could involve but not be limited to, one or more of the following measures based on the nature and extent of the potential impacts to human health and the environment.

- Identification of the probable cause of the effluent limit exceedance(s) and the extent of the impact(s).
- Installation of additional ground water monitoring wells, including an upgradient well.
- Increased sampling (frequency and/or constituents).
- Increase the efficiency of the wastewater treatment system.
- Reduce the amount of nutrients or other parameters discharged.
- Addition of disinfection to the effluent prior to discharge beneath the drainfields.
- Supply drinking water to hydraulically downgradient residences.

## XI. NON DEGRADATION SIGNIFICANCE DETERMINATION

The Department has determined that this discharge constitutes a new or increased source for the purpose of the Montana Nondegradation Policy (75-5-303, MCA; ARM 17.30.702(16)). This discharge will not impact the shallow confined aquifer and the phosphorous breakthrough to the nearest surface water (Lake Koocanusa) is greater than 50 years. The nonsignificance determination was based on the effluent flow rate of 96,650 gpd and the use of a Level II wastewater treatment system (RSF and subsurface drainfield) that treats TN (as N) to 24 mg/L beneath the drainfield. The nonsignificance determination for TP was based on a TP load of 3,117 lbs/yr for Outfall 001.

The applicable water quality standards for Class I ground water are summarized in Table 1. The effluent limit for TP is based on compliance with nondegradation criteria [ARM 17.30.715(1)(e)]. The effluent limit for nitrate + nitrite, (as N) is based on water quality standards (DEQ Circular 7) at the dose tank prior to discharge based on nondegradation criteria for a new source.

## XII. INFORMATION SOURCES

In the development of the effluent limitations, monitoring requirements and special conditions for the draft permit, the following information sources were used to establish the basis of the draft permit and are hereby referenced:

ARM Title 17, Chapter 30, Sub-chapter 5 - Mixing Zones in Surface and Ground Water, September 1999.

ARM Title 17, Chapter 30, Sub-chapter 7 - Nondegradation of Water Quality, March 2000.

ARM Title 17, Chapter 30, Sub-chapter 10 - Montana Ground Water Pollution Control System (MGWPCS), March 2002.

Cherry, J.A. and Freeze, R. A., *Groundwater*, Prentice-Hall Inc., Englewood Cliffs, NJ., 1979. Chapter 2, pages 26-29.

Coffin, "Surficial Geology and Water Resources of the Tobacco and Upper Stillwater River Valleys, Northwestern Montana", USGS Bulletin 81, February 1971.

DEQ Circular 2, 1999.

DEQ Circular 4, 2004.

DEQ Circular 7 – Montana Numeric Water Quality Standards, February 2006.

DEQ, Memo-Regensberger, "Revised Modification of Phosphorous Concentration for Domestic Sewage in Nondegradation Reviews," October 29, 1998.

DEQ, "Nitrate Sensitivity Analysis Input Data", 1994.

DEQ, "Non-Point Source Water Quality Standard Operating Procedures" (4/1/95) at www.deq.state.mt.us/wqinfo/monitoring/SOP/Sap.asp

DEQ Subdivision Section, Subdivision Improvement Drawings.

Driscoll, *Ground Water and Wells*,

Engineering Report, October 2006.

Fetter, *Applied Hydrogeology*,

GWIC Database, http://mbmggwic.mtech.edu

Soil Survey, "Kootenai National Forest Area, Montana and Idaho".

Montana SSURGO Soils, GWIC

Pitman, Mark, e-mail Nitrate Sensitivity Information, June 21, 2006.

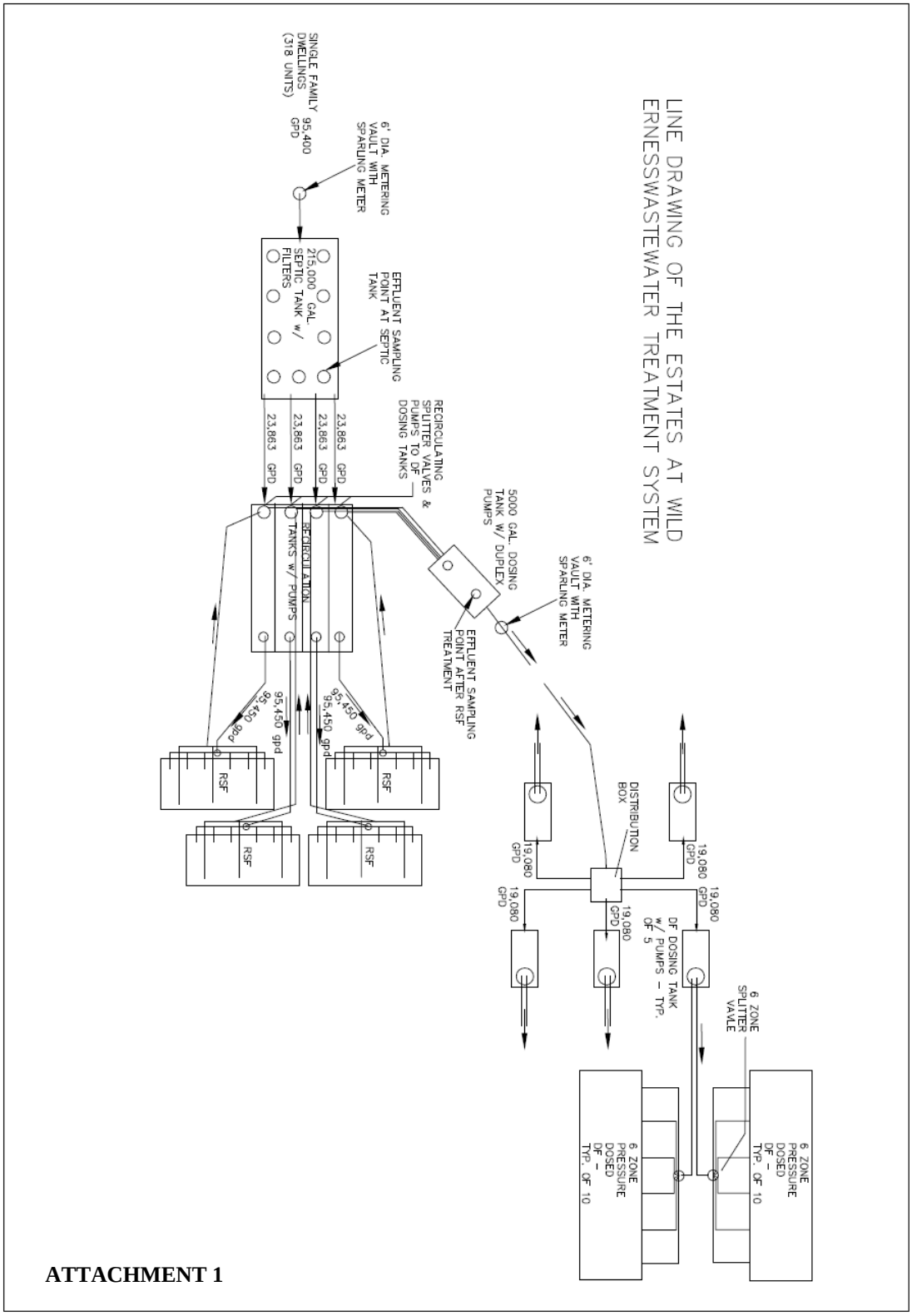
U.S. Environmental Protection Agency, Rev September 2000. U.S. EPA NPDES Permit Writers' Course, Helena, Montana, September, 2000, Workbook EPA 833-B-97-001.

U.S. Environmental Protection Agency, February 2002. *Design Manual: Onsite Wastewater Treatment and Disposal System*. EPA 625/R-00/008, p. 3-29 (Table 3-19) and Fact Sheet TFS-9 "Fixed Film Processes", and Table 1, TFS-51.

## XIII. ATTACHMENTS

Attachment 1 - Wastewater Flow Line-Diagram

**Prepared by:** Pat Potts **Date:** April 9, 2007




**ATTACHMENT 1**

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SEWAGE TREATMENT LINE DRAWING

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